



**U.S. ENVIRONMENTAL PROTECTION AGENCY  
POLLUTION/SITUATION REPORT  
Flat Top Mine - Removal Polrep**



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region VIII**

**Subject:** POLREP #5  
Progress  
Flat Top Mine  
SDN000802781  
Ludlow, SD  
Latitude: 45.8456780 Longitude: -103.3678530

**To:**  
**From:** Shun-Ping Chau, OSC  
**Date:** 6/17/2014  
**Reporting Period:** 06/11/2014 to 09/24/2014

**1. Introduction**

**1.1 Background**

<b>Site Number:</b>	08RW	<b>Contract Number:</b>	
<b>D.O. Number:</b>		<b>Action Memo Date:</b>	
<b>Response Authority:</b>	CERCLA	<b>Response Type:</b>	Time-Critical
<b>Response Lead:</b>	EPA	<b>Incident Category:</b>	Removal Action
<b>NPL Status:</b>	Non NPL	<b>Operable Unit:</b>	
<b>Mobilization Date:</b>	10/1/2012	<b>Start Date:</b>	10/1/2012
<b>Demob Date:</b>		<b>Completion Date:</b>	
<b>CERCLIS ID:</b>	SDN000802781	<b>RCRIS ID:</b>	
<b>ERNS No.:</b>		<b>State Notification:</b>	
<b>FPN#:</b>		<b>Reimbursable Account #:</b>	

**1.1.1 Incident Category**

Time-critical removal.

**1.1.2 Site Description**

The Flat Top Mine Site is northeast of the town of Ludlow, Harding County, South Dakota. Uranium mining activities occurred around Ludlow in the North Cave Hills, South Cave Hills and Flint Buttes from the late 1950s to 1964 under the General Mining Laws and Public Law 357, which did not require any restoration. The North Cave Hills and South Cave Hills are part of the Custer National Forest and subsequently owned by the United States Forest Service (USFS).

Flat Top Mine is located in the Flint Buttes and is currently on private ranch land. There have been two previous studies by the South Dakota School of Mines and Technology and the Oglala Lakota College around 2006 and 2007, but no clean-up activities have occurred at the Flat Top Mine.

### 1.1.2.1 Location

The Site is located northeast of the town of Ludlow, in Harding County, South Dakota. Mining activities in the 1950s affected almost 1,000 acres of land in the region. The remnants of Flat Top Mine consist of a water filled pit approximately 1,200 ft by 500 ft. A series of smaller pits, test pits and trenches are currently located within approximately 10,000 acres of undeveloped land used for cattle and sheep ranching but also includes some residential structures.

### 1.1.2.2 Description of Threat

Uranium, arsenic, vanadium and molybdenum, defined by CERCLA Section 101(14) as hazardous substances, are naturally occurring in the Flint Buttes area. Previous mining activities removed the vegetation and top soil cover in certain areas and left large piles of waste materials and open pits that collect surface water. Many of the waste material piles have been covered with vegetation, but humans, livestock and wild animals are exposed to higher than background levels of these hazardous substances found in water which collects in open pits.

### 1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results

Site assessment work conducted in 2009 and 2011 showed that the highest concentration of contamination occurs at and around an old mine pit that is now the largest pond on the north side of an old highwall, approximately 0.5 miles north of the town of Ludlow. Uranium was detected in soil sediments with concentrations up to 770 parts per million (ppm) and in surface water with concentrations up to 558 micrograms per liter ( $\mu\text{g/L}$ ). EPA sets the safe drinking water standard for humans at 30  $\mu\text{g/L}$ , and guidelines from several agricultural extension offices recommend a maximum concentration of 200  $\mu\text{g/L}$  for livestock. Other elements of concern with elevated levels in the surface water were arsenic with concentrations ranging from 457 to 536  $\mu\text{g/L}$ , vanadium with concentrations ranging from 73 to 258  $\mu\text{g/L}$ , and molybdenum with concentrations ranging from 894 to 1,730  $\mu\text{g/L}$ . The guidelines for livestock drinking water recommend a maximum arsenic concentration of 200 to 500  $\mu\text{g/L}$ , maximum vanadium concentration of up to 100  $\mu\text{g/L}$ , and maximum molybdenum concentration of 300 to 500  $\mu\text{g/L}$ .

## 2. Current Activities

### 2.1 Operations Section

#### 2.1.1 Narrative

Planned removal action includes treating water from the largest mine pit at the Site, returning the treated water to its original use as livestock drinking water and/or pasture irrigation, backfilling and re-vegetating the pit, and drilling wells to replace the livestock water supply.

#### 2.1.2 Response Actions to Date

In addition to activities described in previous reports, between May 5 and May 15, 2013 approximately 85,000 cubic yards of tailings were placed to backfill the old mine pit and contoured to minimize water pooling. Soil from undisturbed areas was used to create a cap to improve the success of revegetation efforts. Hydroseeding has taken place and straw bales and bats have been placed for erosion control.

The top layer of soil was screened with XRF, and 10 five-point composite samples were taken to confirm that the levels of arsenic and uranium were within limits acceptable for pasture. Human exposure to the soils will be very limited.

#### 2.1.3 Enforcement Activities, Identity of Potentially Responsible Parties (PRPs)

#### 2.1.4 Progress Metrics

Waste Stream	Medium	Quantity	Manifest #	Treatment	Disposal


## **2.2 Planning Section**

### **2.2.1 Anticipated Activities**

A heavy rain storm appeared immediately after hydroseeding, washed away a large amount of seeds, and created scouring and other erosional issues. A second round of grading and seeding is planned in summer/fall 2014.

#### **2.2.1.1 Planned Response Activities**

Site reconnaissance was conducted in June 2014 to assess the state of revegetation and the extent of erosion due to an exceptionally harsh winter.

Grading and additional erosional control measures will be undertaken in summer/fall 2014. Efforts will also be made to stabilize the access road to the site. Because of funding and timing issues, re-seeding will not occur until 2015.

#### **2.2.1.2**

### **2.2.2 Issues**

Availability of additional funding will be crucial to additional work required to make the removal efforts more permanent.

## **2.3 Logistics Section**

No information available at this time.

## **2.4 Finance Section**

No information available at this time.

## **2.5 Other Command Staff**

No information available at this time.

## **3. Participating Entities**

No information available at this time.

## **4. Personnel On Site**

1 EPA toxicologist/health physicist, 1 EPA engineer, 1 EPA OSC

## **5. Definition of Terms**

No information available at this time.

## **6. Additional sources of information**

No information available at this time.

## **7. Situational Reference Materials**

No information available at this time.